WHAT IS CLAIMED IS:

1. A method of forming a thin silicon oxide layer over a substrate disposed in a substrate processing chamber, said method comprising:

introducing tetraethylorthosilane into the processing chamber;

purging the tetraethylorthosilane from the processing chamber;

introducing ozone into the processing chamber after purging of the tetraethylorthosilane; and

purging the ozone from the processing chamber.

2. The method of claim 1, further comprising repeating:

introduction of tetraethylorthosilane;

purging of the tetraethylorthosilane;

introduction of the ozone; and

purging of the ozone.

3. The method of claim 1 further comprising:

introducing ozone into the processing chamber prior to introducing the tetraethylorthosilane; and

purging the ozone from the processing chamber prior to introducing tetraethylorthosilane.

4. The method of claim 1 wherein the thin silicon oxide layer is formed over a silicon nitride mask and over a thermal oxide trench liner.

5. The method of claim 1 further comprising performing chemical vapor deposition of silicon oxide on top of the thin silicon oxide layer.

6. The method of claim 5 wherein the chemical vapor deposition of silicon oxide is performed by mixing tetraethylorthosilane and ozone in the processing chamber following purging of the ozone.

7. The method of claim 5 wherein the chemical vapor deposition of silicon oxide is performed in a different processing chamber.

8. The method of claim 1 wherein the tetraethylorthosilane and the ozone are purged from the processing chamber by introduction of an inert gas.

9. The method of claim 8 wherein the inert gas is selected from the group consisting of argon, helium, nitrogen, and various mixtures thereof.

10. A method of treating a surface to receive chemical vapor deposited silicon oxide, the method comprising:

exposing the surface to a silicon-containing precursor gas in a processing chamber;

purging the silicon-containing precursor gas from the processing chamber;

introducing an oxidant into the processing chamber after purging the silicon-containing precursor gas; and

purging the oxidant from the processing chamber, such that a thin layer of oxide is formed over the surface to serve as a basis for subsequent uniform chemical vapor deposition of silicon oxide.

11. The method of claim 10 further comprising repeating:

introduction of the silicon-containing precursor gas;

purging of the silicon-containing precursor gas;

introduction of the oxidant; and

purging of the oxidant.

12. The method of claim 10 further comprising:

introducing the oxidant into the processing chamber prior to introduction of the silicon-containing precursor gas; and

purging the oxidant from the processing chamber prior to introduction of the silicon-containing precursor gas.

13. The method of claim 10 wherein the surface comprises a silicon nitride mask layer and a thermally-grown oxide trench liner layer.

14. The method of claim 10 further comprising performing chemical vapor deposition of silicon oxide over the thin oxide layer.

15. The method of claim 14 wherein performing chemical vapor deposition of silicon oxide comprises mixing the silicon-containing precursor gas and the oxidant in the processing chamber following the oxidant purge step.

16. The method of claim 14 further comprising:

transferring the surface to a different processing chamber; and

performing chemical vapor deposition of silicon oxide in the different processing chamber.

17. The method of claim 10 wherein the silicon-containing precursor gas comprises tetraethylorthosilane (TEOS) and the oxidant comprises ozone.

18. The method of claim 10 wherein the silicon-containing precursor gas comprises $SiCl_4$ and the oxidant comprises steam (H_2O).

19. The method of claim 10 wherein the silicon-containing precursor gas comprises $Si(NCO)_4$ and the oxidant comprises steam (H_2O).

20. The method of claim 10 wherein the silicon-containing precursor gas comprises $CH_3OSi(NCO)_3$ and the oxidant comprises hydrogen peroxide (H_2O_2).

21. The method of claim 10 wherein the silicon-containing precursor gas and the oxidant are purged from the processing chamber by introduction of an inert gas.

22. The method of claim 21 wherein the inert gas is selected from the group consisting of argon, helium, nitrogen, and mixtures thereof.

23. A method of forming a shallow trench isolation structure on a silicon substrate having a plurality of trenches etched therein to define isolation regions and a plurality of masked regions on an upper surface of said substrate positioned between said isolation regions, said method comprising:

exposing the substrate to an oxidizing ambient to create a thermal oxide layer within the trench;

forming a layer of silicon oxide over the thermal oxide layer by alternating

(i) introducing to the chamber a first gas consisting of one of a silicon-containing precursor gas and an oxidant,

(ii) purging the first gas from the chamber,

(iii) introducing to the chamber a second gas consisting of the other of the silicon-containing precursor gas and the oxidant,

(iv) purging the second gas from the chamber, and

(v) repeating steps (i) - (iv) until a desired thickness of the silicon oxide layer is achieved; and

filling the trenches with chemical vapor deposited silicon oxide material.

24. The method of claim 23 wherein the silicon-containing precursor gas comprises tetraethylorthosilane (TEOS) and the oxidant comprises ozone.

25. The method of claim 23 wherein the silicon-containing precursor gas comprises $SiCl_4$ and the oxidant comprises steam (H_2O).

26. The method of claim 23 wherein the silicon-containing precursor gas comprises $Si(NCO)_4$ and the oxidant comprises steam (H_2O).

27. The method of claim 23 wherein the silicon-containing precursor gas comprises $CH_3OSi(NCO)_4$ and the oxidant comprises hydrogen peroxide (H_2O_2).